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DOCUMENT REVIEW: DRAFT TECHNICAL MEMORANDUM NUMBER 7, ADDENDUM TO FINAL PHASE II RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION/REMEDIAL INVESTIGATION WORK PLAN, SURFACE SOIL SAMPLING AND ANALYSIS PLAN, ROCKY FLATS PLANT 903 PAD, MOUND, AND EAST TRENCHES (OPERABLE UNIT 2)

NOTE: These comments were received after the TM 7 had already been finalized and approved by the Agencies. Therefore, corrections will not be made to TM 7. Instead, necessary corrections will be made to the work in progress and included in the OU 2 Phase II RFI/RI Reports.

GENERAL COMMENT

The objective for sampling strategy (i.e., to obtain data to estimate the 95 percent upper confidence limit (UCL) on the mean concentration for risk assessment) is conceptually flawed. The objective of sampling should be to characterize the nature and extent of contamination. The decision to average the concentration for risk assessment over the sampled area depends on the spatial distribution of the data and the decision the risk assessment is meant to support. For example, if the question is whether or not to reembody a specific Individual Hazardous Substance Site (IHSS), it would be useless to assess risk based on average concentrations across the 1-square mile area proposed to be sampled in this plan.

RESPONSE: The objective for the Operable Unit 2 surficial soil sampling plan is to support the assessment of Human Health risks across the whole OU for the RFI/RI Report. The whole OU was chosen as the subject area since human exposure to contaminants is a random process across an area. To take into account that IHSS specific contamination could be present, biased samples were taken in IHSSs where surficial contamination could be present. This biasing would tend to increase exposure point concentrations across the whole OU. The objective of the surficial soil sampling plan was agreed to by EG&G, DOE RFO, EPA and CDH before the sampling plan was developed.

SPECIFIC COMMENTS

1. Section 1.1, page (p.) 1-1, first and second paragraphs: The purpose of this Addendum is to extend the surface soil sampling proposed in the Work Plan to include the analysis of all contaminants that are potentially present at Operable Unit (OU) 2. However, no supporting evidence is presented in this section. Please briefly present the evidence for the proposed additional sampling.

RESPONSE: The purpose for the additional sampling was given in section 2.0 Sampling and Analysis Plan. Section 2.2.2 Sampling Method contains the rationale for the reasoning behind the sampling approach.

2. Table 1-1, p. 1-4 to p. 1-7: The disposal history of most of the IHSSs listed in this table only indicate the possibility of significant release of uranium and plutonium. The evidence presented for the presence of volatile organic compounds, semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs) in the surface environment is extremely tenuous and does not appear to justify the inclusion of these contaminant classes in the sampling protocol. Please clarify.

RESPONSE: The inclusion of semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs) in the sampling plan was in part based on the requirements by the Agencies for the OU 1 soil sampling plan. Also, no information existed that would disqualify the

presence of these compounds. In addition, presence or absence of these compounds is significant for the human health risk assessment.

3. Section 1.2.1.2: The section is devoted to the description of the nature and extent of contamination based on the existing data. Although the document asserts that many organic compounds are contaminants in the area, the spatial distribution of their concentrations over the area is not clear. It is suggested that maps be used to summarize the findings of previous investigations, and a discussion on the possible source(s) of the identified contaminants be added in the text. The map(s) and the discussion are necessary in order to justify the extra sampling proposed in this memorandum.

RESPONSE: Maps will be used to summarize the nature and extent of the soil contaminants in the Draft and Final OU 2 Phase II RFI/RI Reports. Discussions of the possible source(s) of the contaminants will also be included.

4. Section 1.2.1.4, p. 1-17, second paragraph: This paragraph states that the proposed surficial soil sampling will be a representative, uniform, random sampling. However, this statement seems a contradiction in terms and has not been supported by a valid sampling design. Please provide the rationale for the sampling strategy and define the terms "representative" and uniform" used in this paragraph.

RESPONSE: The rationale for the sampling strategy was given in sections 2.2.1 Sampling Objective and 2.2.2 Sampling Method. Characterizing the sampling as representative, uniform and random in section 1.2.1.4 was unfortunate. This was clarified in sections 2.2.1 and 2.2.2. The use of the terms representative and uniform are as follows; the sampling methodology was uniform, the samples were representative.

5. Section 1.2.2.2, p. 1-20, Table 1-2: Minor detection of SVOCs, pesticides, and PCBs in sediments or boreholes is not sufficient justification for extensive surface soil sampling for these compounds. Please expand on such matters as the nature and extent of their occurrences.

RESPONSE: The inclusion of semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs) in the sampling plan was in part based on the requirements by the Agencies for the OU 1 soil sampling plan. In addition, it assumed that the presence or absence and the extent of these compounds was of significant importance to the human health risk assessment.

6. Section 1.2.2.2, p. 1-22, first paragraph: Please present an expanded justification for sampling for specific radionuclides listed in this paragraph as well as for gross alpha and beta. Minor detection of specific radionuclides elsewhere at OU 2 is not sufficient to justify extensive surface soil sampling.

RESPONSE: The primary radionuclides of concern to OU 2 were investigated in prior investigations. The remaining potential radionuclides of concern were sampled in order to present a complete human health risk assessment.

7. Section 1.2.2.3, p. 1-28, first paragraph: The discussions of Level IV and Level III data quality may be misleading. Level III data are obtained using the same quality assurance/ quality control procedures as Level IV data. Contract Laboratory Program (CLP) methods are

often used to obtain Level III data. If CLP methods are used, the only difference between Level III and Level IV data is that the laboratory provides a more detailed data package with the Level IV data, and the data validation process for Level IV data is more rigorous (see also the next comment). Please clarify the descriptions of Level III and Level IV data.

RESPONSE: Noted. The above description will be included as necessary in future reports.

8. Section 1.2.2.3, p. 1-28, second paragraph: The statement that only Level V and Level IV data can be validated is incorrect. Data are not considered Level III data until they are validated. As discussed above, if CLP analytical methods are used, Level III and Level IV analytical results are the same. What determines the data quality level is the level at which the data are validated - Level III or Level IV. Validation at Level III is sufficient for risk assessment. Validation at Level IV requires more deliverables from the laboratory (e.g. raw chromatograms) and a detailed review of the additional data during validation. Level IV validation takes twice as long as Level III validation (several hours per sample) and unnecessarily increases project costs. Recommend that data quality of Level III is sufficient.

RESPONSES: All analytical data for RFP is acquired as per the requirements of the Sample Management subcontracts as specified in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP). Validation protocol is also the responsibility of this group. This is done to ensure that comparable and consistent data is acquired for all projects.

9. Section 2.2.1, p. 2-2, third paragraph: The objective for sampling (i.e., to obtain data to estimate the 95 percent UCL on the mean concentration for risk assessment) is conceptually flawed. (Please see General Comment above.)

RESPONSE: The surficial soil sampling program was initiated due to the recognized need for a limited surficial soil sampling program to support the human health risk assessment for OU 2 on an OU wide basis. For that reason, the nature and extent of contamination was characterized sufficient for use in the human health risk assessment only.

10. Section 2.2.2, p. 2-6, third and fourth paragraphs: Please justify the statement that a sample population of 40, (i.e., 6 samples in the IHSSs and 34 samples in the square mile east of the source areas), will be adequate to assess contaminant distributions across OU 2. It is questionable if 6 samples are adequate to characterize the IHSSs sufficiently for the Feasibility Study (FS). The 34 remaining samples are on a grid on 1200 feet centers (i.e., a single sample will represent approximately 33 acres). Please explain further why this sampling arrangement is considered adequate.

RESPONSE: As discussed above, the surficial soil sampling program was initiated due to the recognized need for a limited surficial soil sampling program to support the human health risk assessment for OU 2 on an OU wide basis. This was intended to be a cost effective means of acquiring necessary data for the human health risk assessment.

11. Section 2.2.2, p. 2-6, first paragraph: It is unclear why mixing the biased and grid sampling approaches will satisfy either risk assessment requirements or FS requirements as stated here. For example, averaging concentrations over the entire area sampled, even with biased samples included, is likely to badly underestimate concentrations in the IHSSs which will be the focus of the FS.

RESPONSE: The biased samples support the FS. The mixing of biased and grid samples provides a more conservative approach to estimating surficial soil chemical concentrations.

12. Section 2.2.2, p. 2-8, first paragraph, last sentence: Again, the conclusion that the proposed sampling scheme provides for a systematic and conservative characterization of potential surface soil contamination has not been justified. Specific comments 10 and 11 apply here as well.

RESPONSE: If a strictly gridded sampling approach was used, it is unlikely that all IHSSs with known surficial soil contamination would have been sampled. A more conservative approach was chosen to intentionally sample these locations, therefore biasing the results and producing a more conservative risk assessment.

13. Section 2.2.3, p. 2-8, fourth paragraph: It is stated that the background sampling method used for OU 1 is also applicable to OU 2. Both the location and the method needs to be justified in this document for two reasons: first, the statistical treatment of background data from the Rock Creek is unclear as presented in OU 1 Phase III Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation (RFI/RI) Report; second, the "background samples" collected in Rock Creek for OU 1 failed to prove the samples are adequate to serve as background, especially for radionuclides.

RESPONSE: The sampling method for background samples at OU 1 and OU 2 employ the "RFP Method." This approach has been reviewed and approved by EPA and CDH for surficial soil sampling.

The background sampling was performed in order to increase the total number of samples in the background sample. Also, some analytes had not been analyzed in the OU 1 background sampling and were therefore included in the OU 2 background sampling.

14. Section 2.3.2, and 2.3.3, p. 2-10, last paragraph to p. 2-14, third paragraph: Please justify, based on existing chromium contamination, the need for the chromium analysis proposed. Also, please provide the rationales for analyses of 30 percent of the OU 2 and background samples for specific conductance, pH, and total organic carbon, 20 percent of the OU 2 and background samples for bulk density testing.

RESPONSE: A chromic acid spill resulted in spraying Chromium VI over IHSSs 216.2 and 216.3. While this does not usually persist in the environment, it was decided that a smaller number of samples be analyzed for Chromium VI to ensure that this assumption was correct. Specific conductance, pH, total organic carbon, and bulk density analyses were included in the analyses to support environmental transport modeling of contaminants. In addition, bulk density will be used to determine the pounds per acre of contaminants present in the soil. The other parameters will be used to characterize the soils in a consistent manner with other studies and to ascertain which remediation efforts may be possible. TOC and pH values may impact the choice of remediation methods.

15. Section 3.1, p. 3-1, third paragraph: Laboratory blanks and laboratory replicates are not collected in the field. The laboratory blanks and replicates are derived from the outside laboratory and are a part of their internal control. Please correct the second sentence.

RESPONSE: We agree that laboratory blanks and replicates should not have been included in the list of field samples. This will be corrected for reports in the future.

16. Section 3.1, Table 3-1: Footnote number 1 indicates a misunderstanding of the nature and purpose of field blanks. Field blanks (also called source blanks) are samples from water sources used in decontamination procedures. They are taken to assure that source water is not introducing contamination into environmental samples. It would appear that field blanks would be required for this investigation. Please review this issue. (Note: The OU 1 RFI/RI report claimed a potential problem with the water used for decontamination. Had field blanks been collected, this questions could have been resolved or the problem recognized earlier in the sampling program.)

    Field duplicates are usually taken at a frequency of 1 in 10 rather than 1 in 20 as specified here. Please confirm that the frequency specified here is consistent with Environmental Protection Agency requirements.

    It is also necessary to collect samples for matrix spike and matrix spike duplicate (MS/MSD) analyses, usually at a frequency of 1 in 20. It would appear that MS/MSD samples should be added to the table.

RESPONSE:
a) Field blanks at RFP are samples of the same media which are not contaminated. Samples of the water used in decontamination procedures are not directly sampled. However, if this water is contaminated, the rinsate samples would consistently be contaminated.

b) This field duplicate sampling frequency was approved by the EPA during Agency review of the document.

c) If enough material is provided to the lab, an MS/MSD is run for every 20 samples. It is not always necessary to obtain a sample for this purpose. In addition, even when an MS/MSD sample is taken in the field, the lab may choose another sample for these analyses instead.

17. Section 3.1, p. 3-3, Table 3-2A: Please see specific comment 16 on Table 3-1.

RESPONSE: As above.

18. Section 3.1, p. 3-4, Table 3-2B: Please see specific comment 16 on Table 3-1.

RESPONSE: As above.

19. Section 3.1, p. 3-5, first paragraph: MS/MSD samples are not laboratory samples but are collected in the field. Please review specific comment 16 on Table 3-1.

RESPONSE: While MS/MSD samples depend on material collected in the field, these are spiked in the lab and are therefor lab QA/QC analyses.

20. Section 3.2, p. 3-5, fifth paragraph: The expression of accuracy is incorrect. The correct expression should be:

$$(A_r - A_o)/A_f) \times 100 \text{ percent.}$$

RESPONSE: The formula in the comment and the formula in the report are mathematically equivalent. Multiplying $(A_r - A_o)$ by 100 percent before dividing by A_f yields the same result as

dividing (A_r - A_o) by A_r and then multiplying by 100 percent. No change is necessary.

21. Section 3.4, p. 3-9, second paragraph: The formula for relative percent difference (%RPD) is incorrect. The correct expression is:

$$\%RPD = 2 \times [(C_1 - C_2)/(C_1 + C_2)] \times 100 \text{ percent.}$$

RESPONSE: This corrected formula will be used for data evaluation.

22. Section 3.4, p. 3-9, third paragraph: %RSD usually stands for Relative Standard Deviation instead of "percent relative deviation" used in the text. The text correctly stated that %RSD is the standard deviation relative to the mean of the sample. However, neither the standard deviation nor the mean is expressed correctly in the formula. Please correct the formula.

RESPONSE: The correct formula will be used in the OU 2 Draft and Final Phase II RFI/RI Reports.